

METHOD (complete one survey form per pond)

Aims: To find out whether Fairy Shrimp are i) present in the pond, ii) get an approximate idea of their abundance, iii) collect physical data about the pond that can be used to better understand the ecology of this species and to assess the reasons for any change recorded on future visits, and iv) look in any adjacent ponds to see if Fairy Shrimp are present or absent.

A protected species licence from Natural England is required to survey Fairy Shrimp - **our method is based on observation only** - you do not need to net them or enter the water to take part, but you will still need training and a licence to undertake the survey.

There are currently only a handful of ponds known to support Fairy Shrimp in England. We will survey these ponds as part of the PondNet project, but we are keen to raise awareness of the survey in general in the hope that new sites may be discovered.

- **Equipment:** It's helpful to take a camera to take confirmatory photos of Fairy Shrimp, to take photos of your survey pond for the record, and to take a photograph of your sketch maps if you don't have access to a scanner – alternatively you can post your survey forms to Freshwater Habitats Trust.
- **Survey timing:** Fairy shrimp hatch from drought resistant cysts, but hatching is triggered after ponds have dried out and then refilled with water. Late summer/early autumn can be a good time to visit, but any period of dry weather which results in the pond drying out, followed by rain and subsequent refilling, can cause them to hatch.

The best time to search is when the shrimps are adults: about 4 weeks after the pond has refilled and before predation has a significant effect on the population. The survey window for Fairy Shrimp is therefore between 4 and 8 weeks after the pond has filled with water. This is an approximate survey window to help standardise the survey between sites, but there is flexibility as you may not know exactly when the pond filled. You can also complete more than one survey each year, if the pond fills on multiple occasions. If the pond dries out before the survey window begins, you can submit the records but make a note of this in the species notes box overleaf.

- **Where to look:** Fairy Shrimp typically swim on their backs in the middle of the water column, but will occasionally visit the bottom of the pond and also spend short periods of time swimming at the surface. This distinguishes them from other freshwater shrimps (*Gammarus pulex* and *Crangonyx pseudogracilis*) which dwell on the bottom and very rarely swim upside down. Fairy Shrimp can be found in very shallow pond margins (less than 5cm deep), but will also swim in deeper water (c.50cm deep). They will swim in open water and amongst vegetation; in shade and bright sunshine. Search for them by standing on the pond margin and looking down through the water.
- **Survey the pond:** Search in all areas of the pond you can easily see from the pond margin and if Fairy Shrimp are found; estimate the number of individuals (see below) and fill out the pond habitat survey form for the pond.
- **How to estimate abundance:** If Fairy Shrimp are found in the pond, make an estimate of the number of individuals present, and then record the results as an abundance category (over page).

It can be hard to count the number of individuals, especially if they are very numerous, or at different densities in different areas of the pond. The best approach is to count the individuals in a small area (e.g. 1 m²), and multiply this by the area of the pond. If Fairy Shrimp occur in different areas or habitats in the pond, make separate calculations for each area, and sum them to give a total (see table over page).

If Fairy Shrimp are **not found** at the pond, please record this, and continue to fill out the pond habitat survey. The findings will help identify reasons for their absence from the pond.

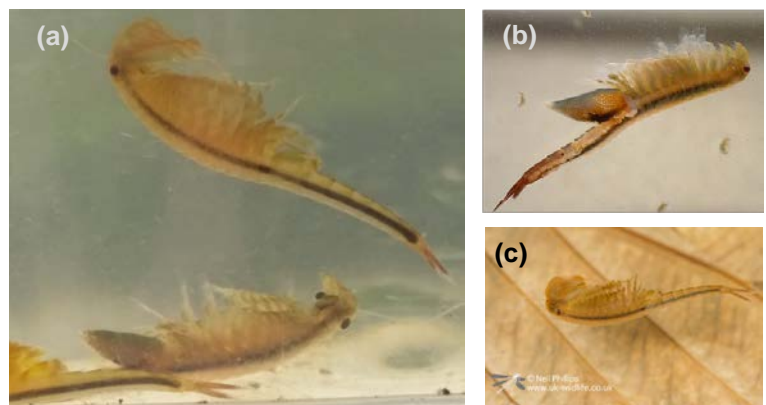
- **Check other ponds and pools in the surrounds:** We are keen to find new ponds for Fairy Shrimp and would like you to look in other ponds to see if they can be discovered. Visit as many nearby ponds or pools as possible (depending on how much time you have available) to see whether Fairy Shrimp are present. **Complete a new PondNet survey form for each pond you visit.**

Once your survey is completed, enter your results online: www.freshwaterhabitats.org.uk/projects/waternet, or email your recording forms and maps to Freshwater Habitats Trust and we can enter the data for you: info@freshwaterhabitats.org.uk.

Fairy Shrimp ID tips: (a) male and female Fairy Shrimp showing typical swimming positions. Adults can be up to 3cm long, but can begin laying eggs at c.1 cm long. Fairy Shrimp can hatch within 48 hours of the pond filling and under ideal conditions will begin to breed within 3 weeks.

We do not need you to tell the difference between males and females but for interest:

(b) Female Fairy Shrimp with egg sac at the base of the tail behind the 'legs' and, (c) Male Fairy Shrimp with 'tusks' protruding from the head. These are used to grasp females during mating.



Your name	<input style="width:95%;" type="text"/>	Date	<input style="width:95%;" type="text"/>
Square: 4 figure grid ref e.g. SP1243 (see your map)	<input style="width:95%;" type="text"/>	Pond: 8 figure grid ref e.g. SP 1235 4325 (see your map)	<input style="width:95%;" type="text"/>
Pond name (if known)	<input style="width:95%;" type="text"/>		
Determiner name (<i>optional</i> - if someone confirms the identity of the species you've recorded)	<input style="width:95%;" type="text"/>	Voucher material (<i>optional</i> - comment if you've taken a photo to confirm identification)	<input style="width:95%;" type="text"/>

If you find Fairy Shrimp please take a confirmatory photo. You can also take a photo of your pond or your maps (or scan them if you have a scanner) and upload them with the record www.freshwaterhabitats.org.uk/projects/waternet.

Number of Fairy Shrimp in your pond

If there are many individuals, count the number in a small area (i.e. 1m²) and multiply up. We've put a table below to help you keep track and make notes, but for the analysis **we only need a total**.

Areas where Fairy Shrimp were found (list): use this table to help with your number calculations, and so you/others can re-find Fairy Shrimp on future visits.	Number of individuals
1.	<input style="width:95%;" type="text"/>
2.	<input style="width:95%;" type="text"/>
3.	<input style="width:95%;" type="text"/>
4.	<input style="width:95%;" type="text"/>
5.	<input style="width:95%;" type="text"/>

Total number of Fairy Shrimp (total count)

Provide a single total for the whole pond based on an actual or estimated number of individuals recorded

Total number of Fairy Shrimp (abundance category)

Then record the number of Fairy Shrimp found in the pond using the following abundance categories:
1, 2-5, 6-10, 11-20, 21-50, 51-100, 101-200, 201-500, 501-1000, 1001-5000, 5001-10000, 10001-20000, 20001+

Fairy Shrimp looked for, but not found

Note: if you *don't* find evidence of Fairy Shrimp at the pond, this is an important result so please still enter these findings online (tick box if none found)

Pond sketch map: Make a sketch map of your ponds and draw on the area where Fairy Shrimp were seen.

Location map: Use this box to show the location of the pond and surrounding ponds you searched (or mark the information on the base map included in your site information pack).

Please complete a POND HABITAT SURVEY sheet at each pond surveyed.

This is a really important part of the survey at your pond. Please complete this form whether Fairy Shrimp were present or absent. Each variable provides information known to be linked to pond quality and community type, and can be used to investigate reasons for change in Fairy Shrimp occurrence. If you are surveying non-pond habitat – complete all variables that apply.

Go to: www.freshwaterhabitats.org.uk/projects/pondnet/survey-options/habitats for survey guides and more information.

Is the pond new? (less than 10 yrs old) **Year of creation?** **Pond Altitude**
yes, no, unknown *date, decade, unknown* *(m)*

Area m² **Note:** This is the *surface area of the pond when the water is at its highest level* (usually in early spring). It will probably *not* be the current water level of the pond. The high water level line should be evident from wetland vegetation like rushes at the pond's outer edge. Measure by pacing (single pace = 0.8-1m) or use online maps.

Pond dries? **1 = Never dries, 2 = Rarely dries:** no more than two years in any ten year period, or only in drought, **3 = Sometimes dries:** dries between three years in ten to most years, **4 = Dries annually.** Deduce pond permanence from local knowledge (e.g. landowner) and personal judgement e.g. water level at the time of the survey. Ponds that dry out annually usually have a hard base.

1 = never dries
2 = rarely dries
3 = sometimes
4 = annually

Overhanging trees & shrubs % of pond overhung by trees and shrubs
 % pond margin overhung to at least 1m from the pond margin

This is an estimate of how much of the pond is *directly* overhung by trees and shrubs, i.e. that would be shaded if the sun was overhead (use the diagram (below) as a guide).

Waterfowl impact **Major** = severe impact of waterfowl e.g. few or no submerged plants, water turbid, pond banks have patches where vegetation removed, feed put down; **Minor** = waterfowl present, but little impact on pond vegetation, pond still supports submerged plants and banks are not denuded of vegetation; **None** = no evidence of waterfowl impact (moorhens may be present).

1 = major
2 = minor
3 = none

Fish presence **Major** = dense populations of fish known to be present; **Minor** = small numbers of Crucian Carp, goldfish or stickleback known to be present; **Possible** = no evidence of fish, but local conditions suggest that they may be present; **Absent** = no records of fish stocking and no fish revealed during survey.

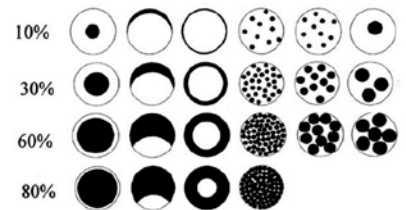
1 = major
2 = minor
3 = possible
4 = absent

Disturbance by dogs **Major** = dogs repeatedly use the pond, compacted edges with little vegetation, water very turbid; **Minor** = dogs use the pond, but little impact on pond vegetation, pond still supports submerged plants and banks are not denuded of vegetation; **None** = no evidence that dogs are using the pond.

1 = major
2 = minor
3 = none

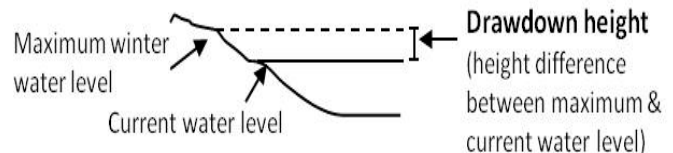
Aquatic vegetation: includes emergent, floating and submerged plants
 % of the whole pond (wet and dry) occupied by emergent vegetation – incl. plants like grasses, water mint and rushes, but not floating (e.g. pondweed) or submerged (e.g. water-crowfoot) species.

% of pond water surface area covered by all vegetation (emergent, floating (excl. duckweed) and submerged).



Water left in the pond % of water area in pond relative to maximum water level. This can be 0% if the pond has dried out.

cm Drawdown. The height drop from the maximum winter water level to current level (see diagram).



Grazing Tick if there is evidence the pond is grazed by livestock. If **yes**, complete the following boxes:

% of whole pond grazed (note: stock can wade into shallow ponds to graze).

% of pond perimeter grazed (note: stock can wade into shallow ponds to graze otherwise inaccessible edges).

Grazing intensity: rank 1-5 (1=infrequent or low intensity to 5 = margins heavily poached and almost bare).

Pond management (tick): use tick boxes to list management within the last 12 months. Use 'other' box for any extra info.

<input type="checkbox"/> Fully dredged	<input type="checkbox"/> Partly dredged	<input type="checkbox"/> >5% vegetation removed	<input type="checkbox"/> <5% vegetation removed
<input type="checkbox"/> Trees planted	<input type="checkbox"/> Trees clear-felled	<input type="checkbox"/> Trees cut back / coppiced	<input type="checkbox"/> Pond changed shape / size
<input type="checkbox"/> Plants introduced	<input type="checkbox"/> Bank plants mown	<input type="checkbox"/> Structural work e.g. to dam	<input type="checkbox"/> Straw added

Add other or more detail

Water quality:

Turbidity / water clarity: Estimate turbidity looking down into c.20cm depth of water in the pond.

1 = clear; 2 = moderately clear; 3 = moderately turbid; 4 = turbid

Inflows and outflows: (tick if inflow or outflow present or leave blank)

Inflow present Outflow present

Water chemistry: If suitable kits and meters are available (or leave blank)

pH Conductivity ($\mu\text{S cm}^{-1}$)

Nitrate (NO_3^- -N ppm): PPW kits provided by FHT
 (tick one from the following range categories)

<0.2 0.2-0.5 0.5-1 1-2 2-5 5-10 10 +

Phosphate (PO_4^{3-} -P ppm): PPW kits provided by FHT
 (tick one from the following range categories)

<0.02 0.02-0.05 0.05-0.1 0.1-0.2 0.2-0.5 0.5-1 1 +

Pond base: This refers to the *geology* (i.e. rock-type) that immediately underlies the pond. You may know, or be able to see the underlying geology in the base or banks of the pond, especially in new ponds. If not, check a geology map or leave this section blank.

Choose one of the following to categorise the % composition of **each** of pond base: 1= 0-32%, 2= 33-66%, 3= 67-100%

Silt/ clay Sand, gravel, cobbles Hard rock Peat Other (please specify)

Surrounding land use: Estimate the *percentage* of surrounding land-use in distance zones from the pond perimeter (i.e. the maximum winter water level) used to assess pond area. In many ponds the 0-5m zone will include surrounding trees/scrub.

Habitat	0-5m	0-100m	Examples
Trees, woodland & scrub	%	%	Deciduous and coniferous woodland, individual trees, scrub and hedgerows.
Heath & moorland			Lowland and upland heathland, moorland and mountain; includes bracken.
Rank vegetation			Unmanaged grass, neglected and abandoned land, set-aside, verges and buffer strips.
Unimproved grassland			Herb-rich, calcareous and acid grassland (good quality plant indicators usually present). Low percentage of agricultural grasses. Not fertilised, little or no drainage.
Semi-improved grassland			A transition category. Grasslands modified by fertilisers, drainage, herbicides or intensive grazing, but retaining elements of natural grassland types in the area.
Improved grassland			Fertile agricultural grass, often bright green and lush; including parks and golf greens.
Arable			All crops. Includes flower and fruit crops (e.g. strawberries) and ploughed land.
Urban buildings & gardens			Areas in curtilage (associated with buildings); including glass-houses and farm yards.
Roads, tracks & paths			Including car-parks and footpaths.
Rock, stone & gravel			Cliffs, rock-outcrops, gravel-pits, quarries, areas of sand and gravel or stone.
Bog, fen, marsh & flush			Wetland vegetation and blanket bog.
Ponds & lakes			Permanent and seasonal waterbodies; including trackway pools.
Streams & ditches			Rivers, streams, ditches, springs and canals.
Other (state)			E.g. maritime vegetation, saltmarsh, sand-dune, orchards and railways.

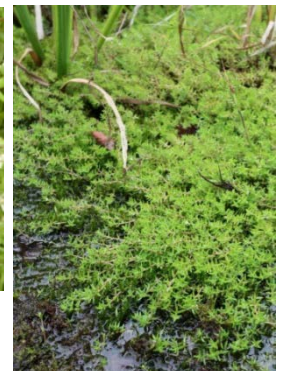
Is the pond in a protected area? (e.g. nature reserve, SSSI, etc.) (choose one option - yes, no, unknown)

New Zealand Pigmyweed *Crassula helmsii*: This non-native weed may have an impact on this species.

% of drawdown zone occupied by New Zealand Pigmyweed

Identification of New Zealand Pigmyweed:

- Can be submerged, emergent and terrestrial.
- Forms dense mats below and above the water surface.
- The flowers it has, if any at all, are very small (less than 1cm) whitish-green to slightly pink with 4 petals.
- Leaves are up to 2cm long in opposite pairs - fleshy for emergent plants, but flatter for submerged parts of the plant.
- Similar species (such as the Water-starworts) do not have fleshy leaves. Water-starworts also have a notch at the leaf tip which is absent in New Zealand Pigmyweed.



Other invasive non-native species:
 (tick all that apply)

Floating Pennywort
Hydrocotyle ranunculoides

Parrot's Feather
Myriophyllum aquaticum

Water Fern
Azolla filiculoides

Non-native Pondweed, e.g.:
 Canadian Pondweed *Elodea canadensis*,
 Nuttall's Pondweed *Elodea nutallii*,
 Curly Waterweed *Lagarosiphon major*

How much of pond perimeter could be surveyed? Note areas of pond not accessible.

Comments box: e.g. new ownership, changes since previous visit, any other information about the pond or survey species.